IOCH

Immunization and Other Child Health Project

Vaccination Coverage Survey of the Tribal and Non-tribal Populations in the North-east Border Areas of Bangladesh

Survey Report No. 12

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Acronyms

BCC	Behaviour Change Communication
BCG	Bacillus of Calmette and Guerin
CES	Coverage Evaluation Survey
COSAS	Coverage Survey Analysis System
DMA	Data Management Aid
DPT	Diphtheria, Pertussis and Tetanus
EPI	Expanded Program on Immunization
IOCH	Immunization and Other Child Health
MSH	Management Sciences for Health
NGO	Non Governmental Organization
OPV	Oral Polio Vaccine
TT	Tetanus Toxoid
UNICEF	United Nations Childrens Fund
Upazilla	Sub district (previously known as Thana)
UPHCP	Urban Primary Health Care Project
WHO	World Health Organization.

Terminology

This provides the meaning of some of the more technical terms used in this report and a brief explanation of their use.

By card: An immunization given to a child is termed as by card if the date of the dose is entered on an immunization card. Only doses recorded by card are treated as valid data in this survey.

By history: Immunization history collected from a parent's recall is termed as by history. Often no date will be mentioned. This information is only included in crude data.

Crude coverage rate is calculated from the doses recorded by card and/or by history. It is not ascertained whether the doses were given at the correct age and/or following the correct interval (where applicable). Crude data however, helps us to understand how much additional coverage could be achieved if all vaccines were given at the optimum age for the child and following the optimum interval. It also provides useful information on access to the EPI program and on the operational aspects of the provision of health services.

Valid coverage rate is calculated from the vaccinations recorded by card. Valid data includes only the doses of vaccines that were given after the minimum date of eligibility and/or after the minimum interval necessary to be effective and to protect the child. There is no maximum interval for a dose and therefore a dose administered after 52 weeks is still regarded as valid. By comparing crude coverage with valid coverage data of any particular antigen, one can determine how much coverage was lost due to the inability to give vaccine at the appropriate time.

Invalid doses are those administered at the wrong age and/or at the wrong interval. Doses administered before the minimum age in the case of DPT/Polio 1st doses and Measles vaccine or with less than four weeks interval in the case of DPT or Polio vaccines are classified as "invalid" doses.

Program access is measured by the percentage of children surveyed who received DPT 1st dose (crude data – by card and history) in the routine immunization session.

The **criteria for a valid dose** used in this survey is the criteria recognised by the Bangladesh EPI program: minimum age for DPT/Polio 1st dose - 6 weeks old; minimum DPT/Polio interval - 4 weeks; minimum age for Measles vaccine - 38 weeks old.

Fully immunized means the child has received all the doses it requires (BCG, OPV 1-3, DPT 1-3 and measles).

Missed Opportunity refers to a visit of a child to a vaccination centre for a dose that he received. However at that time he was also eligible for another dose of antigen that he did not receive. If the missed dose was provided at a later date, it is a *corrected missed opportunity.* If not, it is an *uncorrected missed opportunity*.

Executive Summary

Background

The international border areas of Bangladesh are generally inaccessible and many of them are in difficult terrain (Sundarbans, Hill Tracts, hilly areas of north-east of Bangladesh). A large group of tribal population along with non-tribal Bengalees live in these areas. These areas, for many reasons, are considered high-risk for disease transmission, and as such IOCH considered it important to document the routine immunization coverage in these areas. Accordingly, two 30 cluster vaccination coverage surveys- one for tribal population and the other for non-tribal population, were conducted in the north-east border areas of Bangladesh in November-December. 1999.

Objectives

The overall objective of the survey was to assess the level of immunization coverage in the north-east border areas of Bangladesh where a large number of tribal populations live in. The specific objectives were to:

a) assess the level of immunization coverage of children (12-23 months) and find out the reasons for non-immunization and partial immunization;
b) assess TT immunization coverage among women of 15-49 years of age irrespective of their marital status and find out reasons for non-immunization and partial immunization;
c) find out the difference in immunization coverage, if any, between tribal and non-tribal population; and
d) investigate the plausible reasons for low coverage in particular group(s), and/or difference in coverage between tribal and non-tribal population.

Coverage Levels for the Routine Immunization of Children

Access: 81% of the tribal children and 83% of the non-tribal children had received at least one dose of antigen (DPT 1st dose in this case) from routine immunization sessions based on crude data (card plus history). However, 17% of the tribal and 14% of the non-tribal children had never received any dose of vaccine.

Crude coverage between 12-23 months: 83% of the tribal and 85% of the non-tribal children received BCG, 66% of tribal and 61% of non-tribal children received three doses of OPV, 65% of tribal and 61% of non-tribal children received three doses of DPT and 61% of tribal and 59% of non-tribal children were vaccinated against measles.

Valid coverage between 12-23 months: 83% of the tribal and 85% of the non-tribal children received BCG, 48% of the tribal and 49% of the non-tribal children received three doses of OPV and DPT, and 52% of the tribal and 48% of the non-tribal children received measles vaccine.

Valid coverage by 12 months: 82% of the tribal and 83% of the non-tribal children received BCG, 47% of the tribal and 48% of the non-tribal children received three doses of OPV and DPT, and 44% of the tribal and 40% of non-tribal children received measles vaccine.

There was no significant difference in terms of coverage of routine immunization of children between the tribal population and non-tribal population. However, the dropout rate for the non-tribal population was relatively higher.

For both the tribal and non-tribal population, the proportion of invalid doses was high, indicating low quality of services. 17% of tribal children and 14% of non-tribal children received DPT1 before 4 weeks of age (the minimum required age for DPT1); while 15% of tribal children and 20% of non-tribal children received Measles vaccine before 38 weeks of age, the minimum required age for Measles vaccination.

The prevalence of uncorrected missed opportunities for immunization in both tribal and non-tribal population was low, ranging from 0 to 5%. The overall Measles coverage in non-tribal population would therefore be 5% higher than the survey finding if there had been no missed opportunities.

Reasons for non-immunization and partial immunization of children: The main reasons for non-immunization and partial immunization were the lack of knowledge by the parents/caretakers about the importance of immunization and in particular the need to return for subsequent doses. Fear of side reactions, the lack of knowledge about place and/or time of immunization sessions, absence of vaccinator at the vaccination session and present's preoccupation with other business were also important factors behind low immunization coverage.

Problems detected: Although access to immunization for both the tribal and non-tribal population was fairly high, there was a very high drop out rate (ranging form 20% to 25%) and a number of invalid doses due to early immunization (14% of the tribal and 17% of the non-tribal children received invalid DPT1; while the proportion of invalid doses for measles were 15% and 20% for tribal and non-tribal children respectively). A small percentage of uncorrected missed opportunities occurred at the immunization sessions for both the populations. (ranging 0 - 2% for different antigens for tribal population and 0 – 5% for different antigens for non-tribal children). Child immunization cards were preserved in 51% of the cases for tribal population and 41% for non-tribal population.

Coverage Levels for the TT Immunization of Women

74% of tribal and 88% of non-tribal women of childbearing age (15-49 years) received a first dose of TT. Only 19% of tribal and 27% of non-tribal women received the five doses of TT vaccine. 26% of the tribal and 12% of the non-tribal women had never received any dose of TT vaccine.

The coverage of TT of the tribal women was relatively lower compared to that of non-tribal women. For both the populations, the level of access to TT1 reduced significantly for the subsequent doses of TT. Only one-fifth of the tribal women and one-fourth of the non-tribal women received 5 doses of TT, which is required for life long protect

Reasons for non-immunization and partial immunization of the women: The major reasons cited for non-immunization were that the women were not aware of the need for immunization or the place and/or time of immunization sessions were not known to them. Whereas the major reasons for partial immunization for both the populations were that the women were unaware of need of return for subsequent doses or place and/or time of immunization session were unknown to them

Suggested solutions

The survey indicates a need for appropriate information being given to the parents / caretakers in an effective way about the importance of each child being fully immunized (preferably before 12 months) and about how to achieve full immunization (the time and place of immunization sessions, the number of doses required). It also indicates that a significant level of increased efforts is needed on the part of the vaccine providers to:

a) reduce the zero dose children;
b) be physically present on time at the expected place of immunization session;
c) pay more attention to screening and card retention to decrease the number of too early doses; and
d) explain better the 5 doses TT policy and enforce it.

The women of childbearing age require more education about how to prevent neonatal tetanus with 5 doses of TT vaccine. There is also a need for training to be given to the service providers to help them keep up-to-date with EPI policies and guidelines and increase their capacity for counselling parents about EPI.

Introduction

The international borders of Bangladesh are with India with the exception of a short segment with Myanmar. Many of them are in difficult terrain (Sunderbans, Hill Tracts, hilly areas of Northeast Bengal, *chars*). It also happened that large groups of tribal non-Bengalees are settled in these areas, increasing their heterogeneity.

Because border areas are generally considered high-risk for disease transmission, IOCH considered important to document the routine vaccination coverage and the quality of polio eradication activities in border areas. Two surveys were completed by IOCH in the southwest border areas and one in the Chittagong Hill Tracts.[9,10] It seemed appropriate to survey the Northeast border of Bangladesh, between the Jamuna on the West and Sylhet district on the East. In addition IOCH wanted to compare the coverage rates between tribal and non-tribal populations.

The Northeast border is not only populated by Bengalees (referred here as non-tribal population) but also by about 100,000 tribal non-Bengalees (referred here as tribal population). Among the tribal population, the dominant group is the Garo community (calling themselves Mandis). There are also other ethnic groups like Hodi, Dalu, Banai and Hajong but they are small. The plain Garos came originally from the hills of Meghalaya several centuries ago and switched from *jhum* to wet rice cultivation. The Garos have a matrilineal kinship system and women literacy is high. All Garos speak their own language (mostly Abeng Garo) and Bangla.

Objectives

The overall objective of the survey was to assess the level of immunization coverage in the north-east border areas of Bangladesh where a significant proportion of population was tribal. The specific objectives were to:

a) assess the level of immunization coverage of children (12-23 months)and find out the reasons for non-immunization and partial immunization;
e) assess TT immunization coverage among women of 15-49 years of age irrespective of their marital status and find out reasons for non-immunization and partial immunization;
f) find out the difference in immunization coverage, if any, between tribal and non-tribal population; and
g) investigate the plausible reasons for low coverage in particular group(s), and/or difference in coverage between tribal and non-tribal population.

Methodology and its Limitations

The survey followed the WHO recommended 30-cluster survey method[1], which has been widely used in many developing countries to assess immunization coverage. It is relatively simple and can be done at low cost. (The detailed survey methodology and its limitations are presented in **Annex A**). Briefly, the immunization information is collected on a randomly selected group of 210 children from 30 clusters (7 children per cluster) in a given community. It gives an estimate of immunization coverage to within +/- 10 percentage points of the true population proportion with 95% statistical confidence, assuming a design effect of 2.

The survey was conducted in the border unions (bordering with India) of the north-east part of Bangladesh, stretching from Bakshigonj Upazila of Jamalpur District in the west to Kalmakanda Upazila of Netrakona District in the east. (The location of the survey area is shown in the map on the following page). To allow comparison, the population of the area was stratified into two strata, one for the tribal population and the other one for the non-tribal population. From each of the strata, 30 clusters were selected randomly from a cumulative list of populations of the clusters (villages) in the survey area. 60 clusters (30 clusters for tribal population and another 30 clusters for non-tribal population) were selected. A list of selected clusters for tribal population is given in **Annex C** and for non-tribal population is given in **Annex D.** From each cluster, 7 children between 12-23 months (children born between November 25, 1997 to November 24, 1998) were selected (following 30 cluster survey methodology) to ascertain their routine vaccination status. **Annex B** describes how the dates of eligibility of different antigens in routine immunization were determined. Also, 7 women (between 15-49 years of age, irrespective of their marital status) were selected to ascertain their tetanus toxoid vaccination status.The WHO standard questionnaire was used for documenting child and women immunization status. A separate questionnaire was used for collecting data on reasons for non-immunization or dropouts.

"Data Management Aid" (DMA) a local consulting firm with proven experience in conducting similar surveys was hired through a competitive bidding process to collect the information. DMA recruited the surveyors and supervisors. It also provided a four day orientation training (two days for class room discussion and two days for field practice) for the surveyors and supervisors. IOCH/MSH provided technical support to their orientation. In the field there was a team of two surveyors (male/female) of DMA assigned to one cluster per day. They collected information by checking vaccination cards and also by interviewing parents/care takers. One supervisor was assigned to two teams of surveyors. IOCH had its own team in the field for quality control. At the end of each day the quality control team collected all the forms from the surveyors and they then randomly identified two sample respondents from each of the target groups in each cluster and re-interviewed them on the following day to check the quality of data collected. On that evening, discussions took place with the concerned interview team to resolve any inconsistencies.

All checked questionnaires were handed over to IOCH after completion. Data entry and analysis was done by IOCH using COSAS 4.3[3] and "EPI Info" programs.

Limitations of the 30-cluster survey method

Although this survey method is relatively simple it has several limitations[2] that can be grouped into two types:

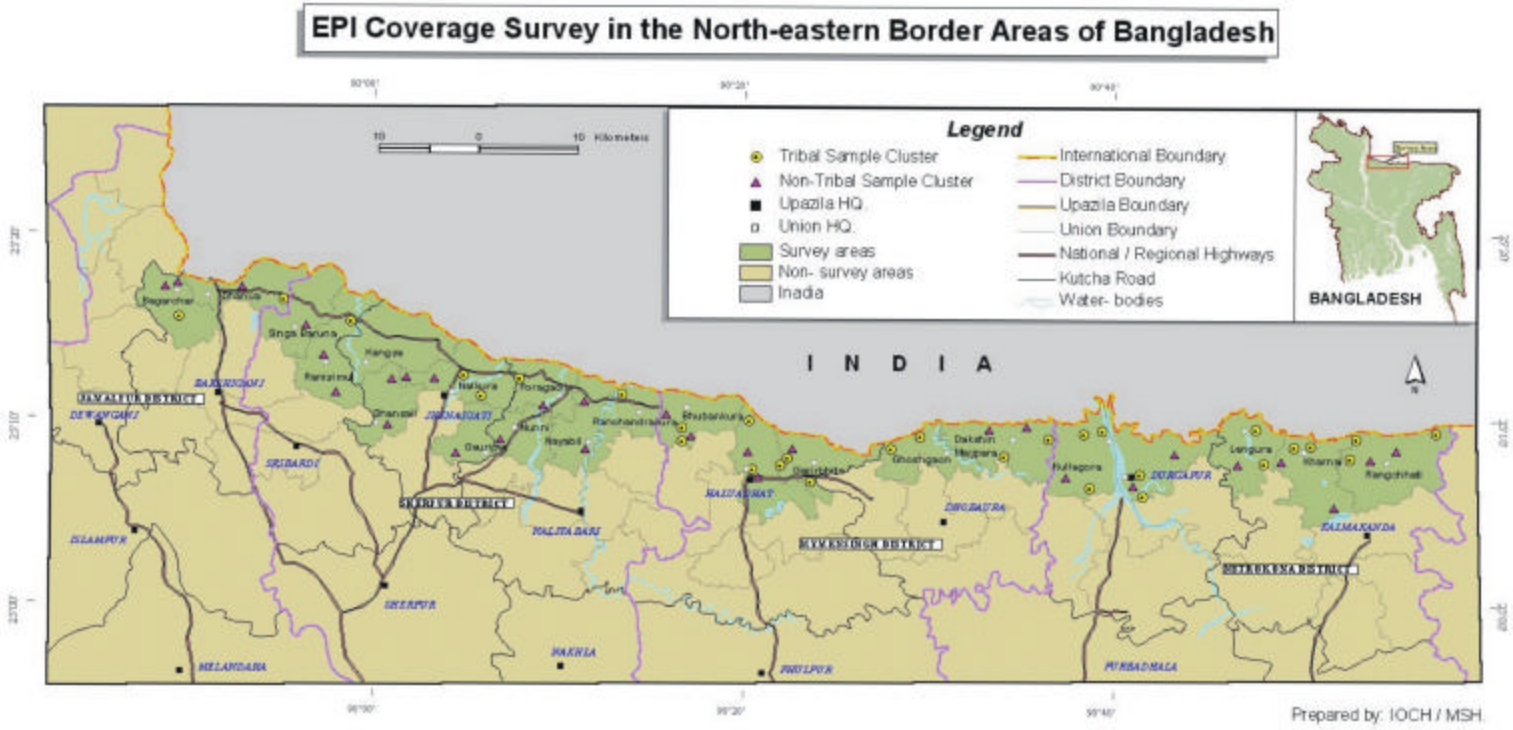
Linked to the sampling method:

- As an inherent bias in the sampling technique in 30 clusters, bigger slums are more likely to be selected as a cluster. The survey leaves out scattered small slums with usually poor access to services. It also does not reflect the lack of uniformity in service availability or the behavior of particular populations.
- There is a wide confidence interval (+/- 10%). It means that if the result for example, shows 38% of children in a particular community received valid measles immunization, then the "true" figure of measles immunization could be anywhere between (38-10) = 28% and (38+10) = 48%. This type of survey is useful when the coverage is low but is less relevant to assess higher coverage or to compare surveys – unless there is a big difference between two survey findings.
- To be relevant the analysis of valid data must apply to a relatively high percentage of available cards.

Linked to the implementation:

- The selection of the index house is key. Too often the proper method is not followed because the surveyors do not make the effort to number all the houses from their location at the centre of the cluster to the end of the cluster along the direction indicated by the bottle.
- If a household includes an eligible child who is not at home for a few hours, the surveyor too often does not return later on but skips the house and substitutes another child. This is, of course, an incorrect procedure that introduces a bias.

It is also important to remember that this survey coverage data gives little information about the current program; as it documents the activities of a year earlier.


EPI Coverage Survey in the North-eastern Border Areas of Bangladesh
Legend
Tribal Sample Cluster
Non-Tribal Sample Cluster
Upazila HQ.
Union HQ.
Survey areas
Non- survey areas
Inadia
International Boundary
District Boundary
Upazila Boundary
Union Boundary
National / Regional Highways
Kutcha Road
Water- bodies
BANGLADESH
I N D I A
Prepared by: IOCH / MSH

Results

A. Routine Immunization coverage of children

Coverage Levels (card plus history data of COSAS analysis)

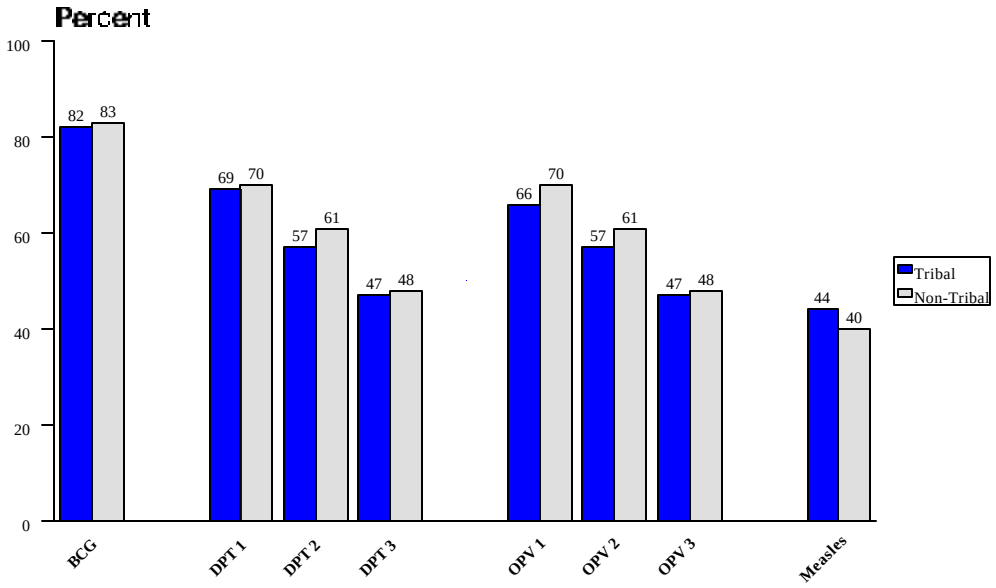
Table 1 shows the coverage levels of children between 12-23 months and their vaccination status at 12 months of age. The crude data figures for tribal population for the 12-23 month age group indicate that 66% of the children received three doses of OPV, 65% received three doses of DPT and 61% were vaccinated against measles. The valid coverage levels are considerably lower (except for BCG), only 48% of children received three valid doses of OPV, another 48% received three doses of DPT and 52% were vaccinated against measles. 17% of the children had not been immunized at all by 23 months and were therefore not reached by the routine EPI program. For non-tribal population, the coverage levels for all antigens were almost similar to those of tribal population. In fact, there was no significant difference in terms of coverage of routine immunization of children between the tribal population and the non-tribal population, both reflecting an unsatisfactory level of performances.

Table 1: Routine immunization coverage levels of children by types of populations

Antigen	Tribal Population			Non-tribal Population		
	(%) Immunized by 23 months		(%) immunized by 12 months Valid data	(%) Immunized by 23 months		(%) immunized by 12 months Valid data
	Crude data	Valid data		Crude data	Valid data	
BCG	83%	83%	82%	85%	85%	83%
OPV1	81%	67%	66%	84%	72%	70%
OPV2	75%	58%	57%	74%	62%	61%
OPV 3	66%	48%	47%	61%	49%	47%
DPT 1	81%	67%	67%	83%	71%	70%
DPT 2	75%	58%	57%	74%	62%	61%
DPT 3	65%	48%	47%	61%	49%	48%
Measles	61%	52%	44%	59%	47%	40%
Zero dose	17%	--	--	14%		-

Table 1 shows little difference (except for Measles) between the valid data of immunization of 12-23 months age group and the valid data by 12 months, and the trend is similar for both tribal and non-tribal population. **Chart 1** shows the actual coverage for children less than 12 months. It does not show significant difference between the two populations—tribal and non-tribal population.

Chart 1: Immunization coverage among children less than 12 months by types of populations



Program access [(percent of children surveyed who received DPT 1st dose (crude data - by card plus history)]

Access to immunization for both tribal and non-tribal population was fairly good. 81% of tribal children received a 1st dose of DPT; while this figure was slightly higher (83%) for non-tribal children.

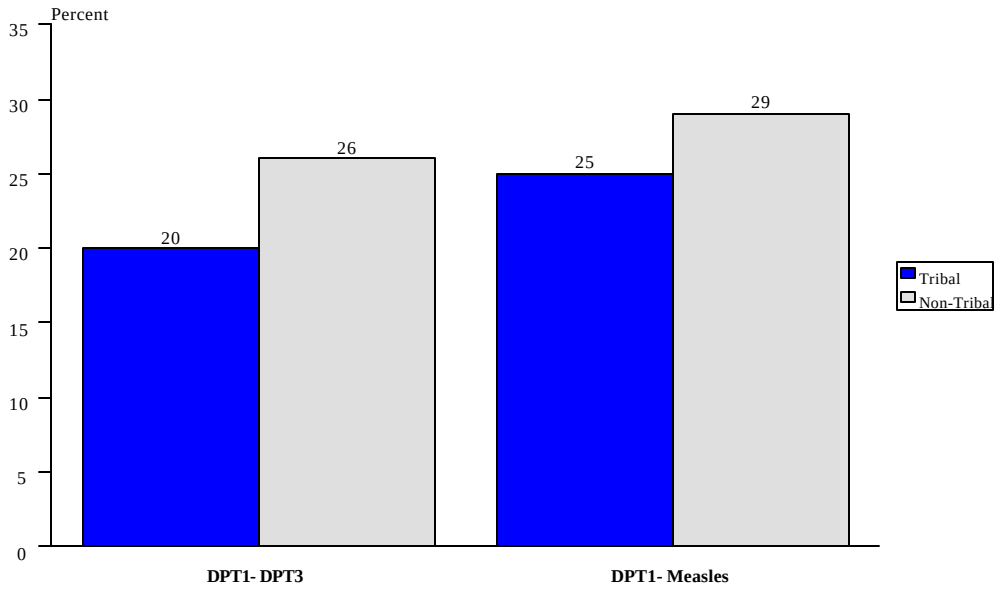
Program continuity (dropout rate)

Crude data for antigens received by 12-23 months of age is used for calculating the dropout rate.

The **Chart 2** shows that the dropout rates for both tribal and non-tribal population were quite high. For tribal population, the dropout rates for DPT1-3 and DPT1-Measles were 20% and 25% respectively. However, the dropout rates for non-tribal population were relatively higher (eg. 26% for DPT1-3 and 29% for DPT1-Measles)

It should be kept in mind, however, that the north-east border areas (where the survey was conducted) are considered hard-to-reach areas, and as such the routine immunization program is likely to be less organized and regular in these areas, compared with other parts of the country. This might partially be attributed to the high dropout rates.

Chart 2: Dropout rate for childhood immunization by types of populations

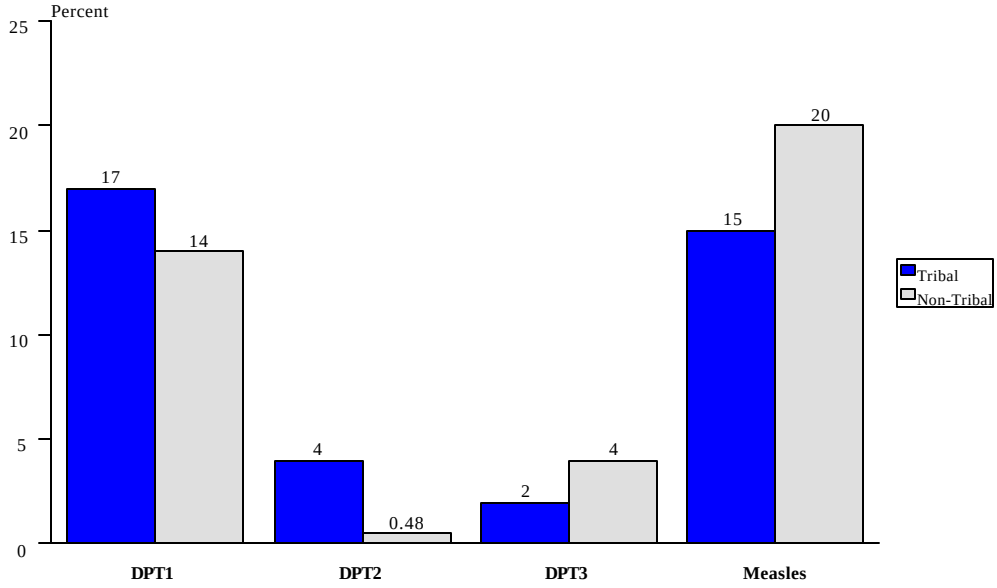


Program quality

Adherence to the immunization schedule – invalid doses

Adherence to the immunization schedule is generally considered to be the major indicator of program quality[4]. The data indicates that, for tribal population, the provider's performances reduced the coverage of DPT1 from an initial access of 81% measured by crude data to a coverage of 67% (valid data) for children between 12-23 months of age. A similar trend is seen for the other antigens excepting BCG. This trend is almost similar for non-tribal population. (**Table 1**).

Chart 3: Invalid doses of immunization provided to children by types of populations



The **Chart 3** shows that a significant proportion of immunization doses was invalid, resulting in unsatisfactory coverage level (valid coverage). 17% of tribal children received an invalid dose of DPT1

and 15% received an invalid dose of measles vaccine due to vaccinations given to them before the minimum required age. The corresponding figures for the non-tribal population were 14% and 20%. In fact, there was no pattern of invalid doses provided in these two distinctive populations- tribal and non-tribal. For tribal population, the proportion of invalid doses for DPT1 was higher; while it was lower for Measles, compared to non-tribal population.

BCG vaccination

83% of the tribal children surveyed received BCG vaccine based on card plus history data. 93% of them were found with a BCG scar. 7% of the tribal children with BCG vaccine did not produce a visible scar. For the non-tribal children, 85% received BCG vaccine with 90% having a visible BCG scar.

Missed opportunities of immunization

The prevalence of uncorrected missed opportunities for immunization was low (ranging 0 for BCG, to 2% for measles) for tribal population. However, for non-tribal population, it was relatively higher (5%) for Measles. The overall measles coverage in non-tribal population would therefore be 5% higher than the survey finding if there had been no missed opportunities. However, the total missed opportunities (uncorrected plus corrected) for both the populations were relatively higher, ranging from 1% for BCG to 10% for Measles. (Table 2).

Table 2: Missed opportunities of vaccination at the vaccination sessions by types of populations

Vaccine	Tribal Population			Non-tribal Population		
	Uncorrected missed opportunity	Corrected missed opportunity	Total missed opportunity	Uncorrected missed opportunity	Corrected missed opportunity	Total missed opportunity
BCG	o%	2%	2%	0%	1%	1%
DPT1	1%	4%	5%	2%	5%	7%
DPT2	1%	3%	4%	0%	4%	4%
DPT3	O%	2%	2%	2%	3%	5%
OPV1	1%	4%	5%	0%	5%	5%
OPV2	1%	3%	4%	0%	4%	4%
OPV3	0%	2%	2%	2%	3%	5%
Measles	2%	4%	6%	5%	5%	10%

Availability of documentation of immunization

For the tribal population, only 51% of child immunization cards were available. However, the availability of immunization cards was relatively lower (41%) for the non-tribal population.

Reasons for non-immunization and partial immunization of children

Table 3 shows that parents of children cited the following reasons for non-immunization: a) unaware of the need for immunization (76% for tribal and 75% for non-tribal population); b) place and/ or time of vaccination session was unknown (48% for tribal and 25% for non-tribal population); and c) fear of side reactions (15% for tribal and 29% for non-tribal population). Whereas the major reasons cited by parents for partial immunization were: a) unaware of need of return for second and third dose (70% for tribal and 56% for non-tribal population); b) vaccinator was absent (12% for both the populations) and c) place and/or time of vaccination session was unknown (10% for non-tribal and 5% for tribal population) and d) parents were too busy (27% for tribal and 7% for non-tribal population).

Table 3: Reasons for non-immunization and partial immunization of children by types of populations *

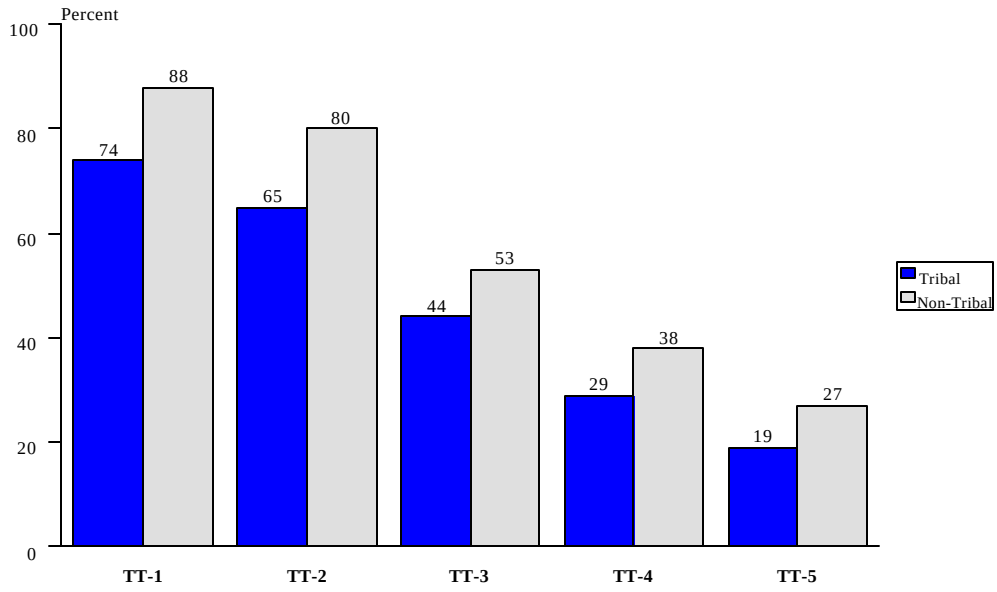
Reasons	Tribal Population		Non-tribal Population	
	Non-immunized	Partially immunized	Non-immunized	Partially immunized
Unaware of need for immunization	76%	-	75%	26%
Unaware of need of return for 2nd or 3rd dose	-	70%	-	56%
Place and/or time of immunization unknown	48%	5%	25%	10%
Fear of side reactions	15%	5%	29%	8%
Wrong ideas about contraindications	3%	-	18%	3%
Other reasons related to lack of information	-	-	-	10%
No faith in immunization	6%	2%	18%	2%
Rumours	3%	2%	4%	2%
Postponed until another time	-	-	-	3%
Place of immunization too far	15%	7%	11%	3%
Time of immunization session inconvenient	12%	5%	-	-
Vaccinator was absent	3%	12%	4%	12%
Vaccine was not available	-	3%	4%	7%
Mother too busy	15%	27%	18%	7%
Family problem, including illness of mother	3%	10%	11%	3%
Child ill, not brought	3%	18%	-	7%
Child ill, brought but not given immunization	-	3%	-	4%
Long waiting time	-	2%	-	-
Other reasons related to obstacles		2%	-	-

***** Almost but not all mothers /caretakers provided answers. *Multiple answers were accepted.*

B. Routine TT immunization coverage of women

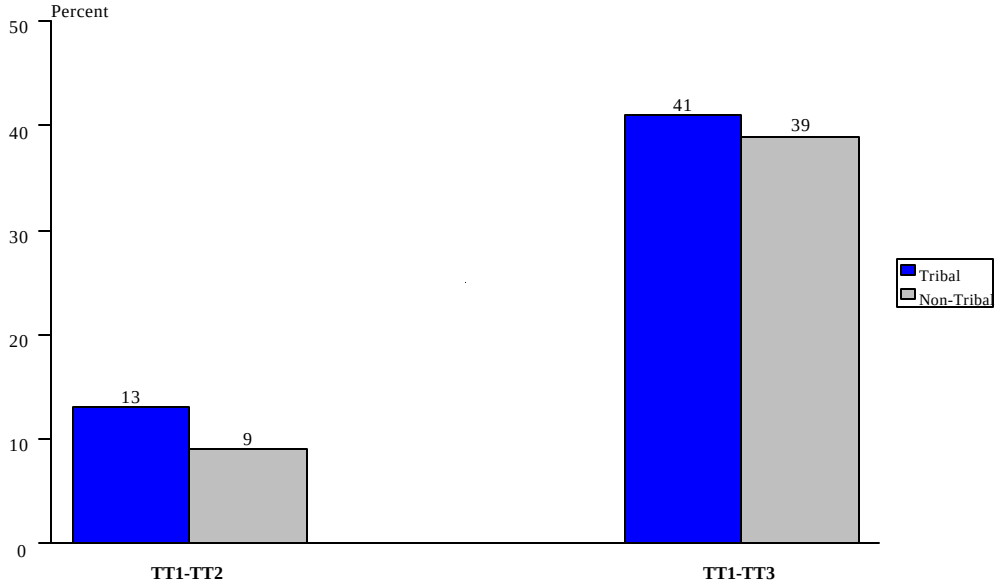
74% (based on crude data) of the tribal women had access to a first dose of TT; while the access level to a first dose of TT of non-tribal women was relatively higher (88%). However, this level of access to TT1 reduced significantly for the subsequent doses of TT. Only 19% of the tribal women and 27% of the non-tribal women had received all the 5 required doses (**Chart 4**). 26% of the tribal women and 12% of the non-tribal women had not received any doses of TT vaccine. The Chart 4 reveals that the coverage of TT of the tribal women was relatively lower, compared to that of the non-tribal women.

Chart 4: Routine immunization coverage levels for TT of women (15 – 49 years) by types of populations



The dropout rate from TT first dose to TT second dose was 13% and the dropout rate from TT first dose to TT third dose was 41% for the tribal women. The corresponding figures for the non-tribal women were 9% and 39% (**Chart 5**). The opportunity for TT (first dose) immunization for both the tribal and non-tribal women during their antenatal check-ups was very low (2%).

Chart 5: Drop out rate for TT immunization by types of populations



Reasons for non-immunization and partial TT immunization of women

Table 4 indicates that the major reasons cited for non-immunization of women were: a) unaware of the need for immunization (70% for tribal women and 73% for non-tribal women); b) place and/ or time of immunization unknown (28% for tribal and 31% for non-tribal women); and c) fear of side reaction (11% for tribal and 23% for non-tribal women). Whereas the major reasons cited for partial immunization of women included: a) unaware of need of return for subsequent doses (48% for tribal and

71% for non-tribal women); b) place and/or time of immunization were unknown (29% for tribal and 32% for non-tribal women; and c) unaware of need for immunization (32% for tribal and 31% for non-tribal women).

Table 4: Reasons for non-immunization and partial immunization for TT of women aged 15-49 years by types of populations*

Reasons	Tribal Population		Non-tribal Population	
	Non-Immunized	Partially Immunized	Non-immunized	Partially immunized
Unaware of need of immunization	70%	32%	73%	31%
Fear of side reactions	11%	5%	23%	2%
No faith in immunization	7%	3%	4%	-
Unaware of need of return for subsequent doses	-	48%	-	71%
Next dose is not yet due	-	-	-	22%
Place and/or time of immunization unknown	28%	29%	31%	32%
Wrong ideas about contraindications	-	-	-	-
Others reasons related to lack of information	4%	2%	12%	2%
Postponed until another time	4%	3%	-	3%
Rumours	2%	-	4%	1%
Others reasons related to lack of motivation	-	2%	-	-
Place of immunization too far	15%	8%	8%	6%
Time of immunization session inconvenient	4%	3%	-	-
Vaccinator was absent	6%	2%	-	4%
Vaccine was not available	-	2%	-	3%
Mother was too busy	9%	11%	-	2%
Family problem including illness of women	4%	3%	4%	3%
Illness of the woman	-	5%	8%	3%
Nobody took the women to EPI center	2%	-	4%	2%
Other reasons related to obstacles	-	6%	-	3%

* *Multiple responses were accepted.*

Discussions

The survey showed that 81% of the tribal children and 83% of the non-tribal children had access to routine immunization (a good achievement given the geographical location of the areas considered hard-to-reach areas). The routine EPI program in these areas is likely to be less organized and regular compared to other parts of the country. Besides, the populations of this area are considered high–risk populations because of their ethnic background (for tribal population) as well as the closer proximity of their locations with an international border. The promising start was eroded by the high dropout rate (e.g. 20% from DPT1 to DPT3 and 25% from DPT1 to Measles vaccine for tribal population and 26% from DPT1 to DPT3 and 29% from DPT1 to Measles for non-tribal population) and by the number of invalid doses (17% for DPT1 and 15% for measles vaccine for tribal population and 14% for DPT1 and 20% for Measles for non-tribal population). 17% of the tribal children and 14% of the non-tribal children surveyed had not been immunized at all. This is indicative of the poor quality of the EPI services. Immunization cards of children were found in 51% cases for tribal population and 41% cases for non-tribal population during the survey, reflecting perhaps the higher literacy rate of tribal women. The absence of cards has serious implications as it may mean that when a child comes to the immunization session for the second or subsequent doses, the vaccinators will have to immunize without accurately knowing the date of birth of the child and the date of previous immunization. This is another factor likely to increase the number of invalid doses given.

It is generally assumed that, because of their ethnic background and geographical location of their inhabitations (hard-to-reach areas), the coverage of routine immunization of the tribal children are likely to be lower than that of the non-tribal children. In this particular geographical area, there was no significant difference in terms of coverage of routine immunization of children between the tribal population and non-tribal population. However, the dropout rates for the non-tribal population was relatively higher.

For both the tribal and non-tribal population, the proportion of invalid doses was high, indicating a low quality of services. 17% of tribal and 14% of non-tribal children received DPT1 before 4 weeks of age (the minimum required age for DPT1); while 15% of tribal and 20% of non-tribal children received Measles vaccine before 38 weeks of age, the minimum required age for Measles vaccination.

The prevalence of uncorrected missed opportunities for immunization in both tribal and non-tribal population was low, ranging from 0 to 5%.

The reasons for non-immunization of children, as reported by the parents/caretakers in both tribal and non-tribal populations included: a) unaware of the need for immunization; b) place and/ or time of immunization unknown; and c) fear of side reaction. Whereas the major reasons cited for partial immunization of children were: a) unaware of need of return for subsequent doses and (b) place and/or time of immunization were unknown. There was no significant difference with regard to causes of non-immunization or partial immunization between the tribal and non-tribal populations.

The coverage of TT of the tribal women (74% for TT1 and 19% for TT5) was relatively lower compared to that of non-tribal women (88% for TT1 and 27% for TT5). For both the populations, the level of access to TT1 reduced significantly for the subsequent doses of TT. Only one-fifth of tribal women and one-fourth of the non-tribal women received 5 doses of TT, which is required for life long protection.

The major reasons cited for non-immunization of women were: a) unaware of the need for immunization; b) place and/ or time of immunization unknown; and c) fear of side reaction. Whereas the major reasons cited for partial immunization of women included: a) unaware of need of return for subsequent doses; and b) place and/or time of immunization were unknown.

Conclusions and Recommendations

Coverage levels for routine immunization of children

Access to routine immunization

Access to routine immunization for both tribal and non-tribal children was found to be satisfactory, given the geographical locations of their inhabitations, as well as the ethnic characteristics of the tribal population. 81% of the tribal children and 83% of the non-tribal children received the first dose of DPT. But this level of coverage was not maintained for subsequent immunizations. This important shortcoming can be mainly attributed to the lack of knowledge on the importance of full immunization leading to the high drop out rates and also to the number of invalid doses and missed opportunities.

The dropout rates

The high dropout rates may be reduced to an acceptable level[5,6,7,8] by:

- providing better counseling to parents/caretakers about the importance of each child receiving all the required antigens before 12 months. They also require advice about when and where they should take their child for the next dose. Most children will need to attend 4 immunization sessions. Majority of the parents of both the tribal and non-tribal children who dropped out reported that it was because they did not know that they were required to return to the EPI center with their children for subsequent doses. The other important reasons for dropout were that the vaccinator was not available at the vaccination session and that the place and/or time vaccination session were unknown.
- undertaking appropriate Behavior Change Communication (BCC) activities through the mass media and service providers to increase awareness of the need for children to receive all the doses of each of the antigens.
- providing refresher training and orientation to the service providers for improving their motivation and skills in counseling. It is apparent from the results of the survey that they lack the relevant technical skills and/or motivation for organizing vaccination session regularly. A significant proportion of parents reported that they were never informed of place and/or time of vaccination sessions, and were never asked to return for 2nd or 3rd doses.
- strengthening field supervision of the vaccine providers and introducing incentive and/or disincentive systems for them for their good or bad performance. This will help ensure regular attendance of the vaccinators at the vaccination sessions, as well as better quality of services.

Invalid doses

For both the tribal and non-tribal populations, a number of the children received invalid doses of vaccine because they received them before the minimum age recommended for each of the antigens or before the minimum interval that should occur between the doses. This indicates the

poor quality of screening, more than inadequate technical knowledge and/ or lack of motivation of the service providers. This situation may be improved by:

- providing appropriate refresher training to the service providers to emphasize proper screening and filling of vaccination cards and to remind them about the correct ages and intervals for immunizations
- strengthening the support given to the service providers through supervision;
- emphasizing the need to retain and use vaccination cards.

Children not being immunized (zero dose)

17% of the tribal children and 14% of non-tribal children were not immunized at all. The main reasons were that parents were not aware of need for immunization, that the place and/or time of immunization session was unknown or the mothers were afraid of side reactions. This situation may be improved by:

- undertaking appropriate BCC activities to reach this still un-reached population and to increase the awareness of the parents for the need for immunization.
- using registration books and improving supervision of the service providers to check that they are really going to the people and attending the vaccination sessions regularly.

Missed Opportunities

The rate of uncorrected missed opportunities for immunizations for the tribal and non-tribal populations was low (range varied from 0% and 5%). The missed opportunities could still be reduced further by:

- checking children's immunization records at each immunization session and immunizing them for doses if eligible
- providing appropriate training to the service providers

Coverage levels for TT vaccination

Access to TT vaccine (TT1) of both tribal and non-tribal women was low and the rate of drop out after the second dose was very high. The coverage of TT5 was very low for both the populations, and 26% of the tribal women and 12% of the non-tribal women had never received any dose of TT vaccine. A woman of reproductive age needs to receive 5 doses of TT to acquire immunity for rest of her reproductive life. TT coverage is likely to be improved by:

- checking TT status of all women between 15-49 years at antenatal check ups and at routine child immunization sessions to see whether the mother or female caretaker is eligible for any dose of TT and giving a dose of TT if it is required
- undertaking appropriate BCC activities to increase awareness of the women of child bearing age of the need for 5 doses of TT vaccinations
- providing refresher training to the service providers on the TT vaccination requirements

Reference and Resource Materials

1. WHO EPI Mid Level Managers module: Evaluate Vaccination Coverage (WHO/EPI/MLM/91.11)

2. Anthony G Turner, Robert J Magnani and Muhammad Shuaib, "A not quick as quick but much cleaner alternative to the Expanded Programme on Immunization (EPI) cluster survey design", International Journal of Epidemiology, 1996, volume 25, Issue No. 1, pages 198-203.

3. COSAS 4.3 version manual, WHO, November 1991.

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5. Expanded Program on Immunization, Ministry of Health and Family Welfare, 1997, 1998, 1999 National Coverage Evaluation Survey report, Dhaka.

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9. Vaccination Coverage Survey of Selected Unions along the North-western Border of Bangladesh-February 2000. Survey Report No. 2. Immunization and Other Child Health Project (IOCH), Dhaka, Bangladesh. 2000

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Annex - A.

The following are extracts from **Anthony G Turner, Robert J Magnani and Muhammad Shuaib's** article entitled ***"A not quick as quick but much cleaner alternative to the Expanded Programme on Immunization (EPI) cluster survey design"*** *published in the International Journal of Epidemiology in 1996, volume 25, Issue No. 1, pages 198-203*.

The standard EPI Cluster Survey Design

"The sample design for the EPI Cluster Survey is a two stage design involving the selection of 30 primary sampling units or 'clusters' (usually village or other area units), from which 210 children with a target age range (usually 12-23 months) are chosen, seven children per cluster. The sample size of 210 children (per domain or stratum) is mandated by the desire to estimate the level of immunization coverage to within +/- 10 percentage points of the true population proportion with 95% statistical confidence, assuming a design effect (i.e. *deff*) of 2.0. Based upon prior experience with immunization coverage surveys (primarily in the US), 30 clusters are generally thought to be necessary to yield sufficiently reliable estimate."

"In the standard design, clusters are chosen from a list of primary sampling units (i.e. villages, urban communities, census enumeration areas etc.) through systematic random sampling with probability proportional to estimated size (*ppes*). The latest estimates of cluster population sizes, which are assumed to be proportional to the number of children in the target age group in each cluster, are typically used as measures of size. The 30 clusters so chosen are then visited by survey field staff who carry out the second stage of sample selection and conduct the household interviews. "

"The original EPI design called for sample children to be chosen randomly from a list of all eligible children in each sample cluster. However, because the creation of lists of households and children tends to be time consuming, costly, and unfeasible in some settings, this procedure is only infrequently used in actual practice. Instead, one of several simplified second stage sampling procedures is commonly used. In one variant, children are selected by first choosing a random direction from a central location in a village or community (e.g. by spinning a bottle). The number of households in that direction to the edge of the community is then counted, and one household is randomly chosen to be the first sample household. Subsequent households are chosen by visiting the nearest neighboring households until information has been gathered on seven children. In a yet simpler variant, a direction from a central starting point is randomly chosen as described above and households are contacted as the interviewer moves in the chosen direction until the required information has been gathered for seven children."

"The second stage sampling methods described above are 'quota sampling procedures' and some of the problems resulting from the use of this approach have been noted over the years."

"First, quota sampling does not ensure that every eligible member of the target population has a known, non-zero chance of being selected. Hence, the standard EPI design, as it is usually applied, is not a true probability sample design. ……."

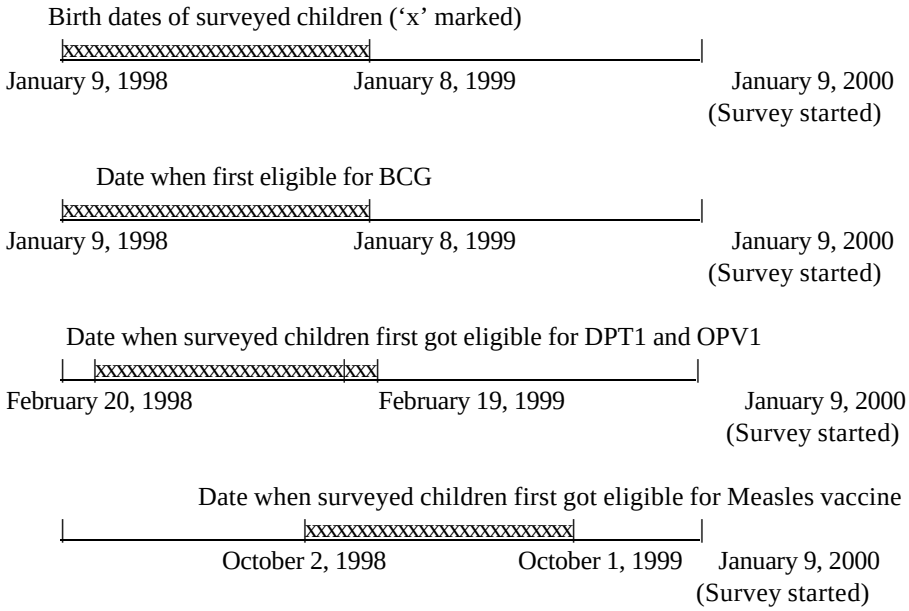
"A second problem concern sampling weights. …….. However, since measures of size in sampling frames are often inaccurate due to census errors and changes in population since the census was taken, application of the standard EPI Cluster Survey method does not automatically result in a self weighting sample. The survey data must be weighed in order to yield unbiased estimates. …… However, since selection probabilities are not known in most EPI Cluster Survey applications, sampling weights can not be calculated."

"Thirdly, a computer simulation study demonstrates that the EPI Cluster Survey based upon quota sampling at the second stage of sample selection is considerably more prone to sampling bias than conventional cluster sampling, particularly where immunized children are 'pocketed' within clusters. "

"Finally, there is the issue of how second stage sample selection should proceed in surveys with multiple measurement objectives."

Annex B

The following illustration describes when children surveyed first became eligible for different vaccines:



Annex C

List of Selected Clusters of Tribal Population

Cluster #	Thana	Union	Mauza / Village	No. of HHs	Total Population
1	Bakshiganj	Bagarchar	Dumurtala	136	600
2		Bagarchar	Gazni	94	412
3	Jhenigati	Nalkura Gauripur	Baruamari	78	504
4		Nalkura Gauripur	Rangatia	59	278
5		Nalkura Gauripur	Samaschura	49	259
6	Nalitabari	Ramchandrakura Mandalia	Kalakuma	61	311
7	Sreebardi	Ranishimul	Balijuri	10	409
8	Dhobaura	Dakshin Maijpara	Bhedikura	140	612
9		Dakshin Maijpara	Jangaliapara	37	271
10		Ghoshgaon	Bhuyanpara	388	1833
11		Ghoshgaon	Ganai	63	306
12	Haluaghat	Bhubankura	Baghaitala	74	317
13		Bhubankura	Telikhali	33	258
14		Gazirbhita	Dakshin Nalkura	94	441
15		Gazirbhita	Samaniapara	233	983
16		Haluaghat	Akanpara	42	198
17		Haluaghat	Gobrakura	233	1079
18		Haluaghat	Phulgharmujakhali	29	172
19	Durgapur	Durgapur	Durgapur	30	127
20		Durgapur	Kharas	117	500
21		Kullagora	Baheratali	52	300
22		Kullagora	Kanika	76	338
23		Kullagora	Panchkahania	100	439
24	Kalmakandi	Kharnai	Hatgobindapur	114	523
25		Kharnai	Kharnai	99	452
26		Lengura	Dhenaki	68	300
27		Lengura	Lengura	212	986
28		Rangchhati	Baruakona	45	268
29		Rangchhati	Mohadeo	185	950
30		Rangchhati	Panchgaon	217	1019

Annex D

List of Selected Clusters of Non-tribal Population

Cluster #	Thana	Union	Mauza /Village	No. of HHs	Total Population
1	**Bakshiganj**	Bagarchar	Ghasir Para	1232	5612
2		Bagarchar	Uthaner Para	220	1043
3		Dhanua	Laucha Para	807	3713
4	**Jhenaigati**	Kangsa Dhansail	Dhansail	1112	5062
5		Kangsa Dhansail	Kanduli	931	4718
6		Nalkura Gauripur	Bangaon	1750	8138
7		Nalkura Gauripur	Dephlai	784	3729
8		Nalkura Gauripur	Phulari	188	926
9	**Nalitabari**	Nunni Poragaon	Benkikura	100	586
10		Nunni Poragaon	Nunni	1074	6317
11		Ramchandrakura Mandalia	Daodhara K. Para	223	1291
12		Ramchandrakura Mandalia	Nayabil	347	1544
13	**Sreebardi**	Ranishimul	Bhayadanga	1595	6571
14		Ranishimul	Rani Shimul	836	3419
15		Singabaruna	Karnajjhora	787	3384
16	**Dhobaura**	Dakshin Majipara	Joyrampara	103	453
17		Dakshin Majipara	Uttar Ranipur	294	1451
18	**Haluaghat**	Bhubankura	Amirkhankura	177	868
19		Bhubankura	Rangampara	30	126
20		Gazirbhita	Suriyapur	261	1288
21		Haluaghat	Haluaghat	804	4352
22		Haluaghat	Manikura	982	4548
23	**Durgapur**	Durgapur	Durgapur	2053	10710
24		Durgapur	Menkifanda	548	2708
25		Kullagora	Kakra Kanda	322	1753
26	**Kalmakanda**	Kharnai	Gouripur	114	680
27		Kharnai	Uttar Ranigaon	399	1983
28		Lengura	Shibpur	910	4492
29		Rangchhati	Mohadeo	643	3142
30		Rahgchhati	Teratopa	484	2598

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10. Vaccination Coverage Survey of the Slums of Dhaka City Corporation- January 2000. Dhaka Slums of Zones 5, 6 & 7. Survey Report No. 10. July 2000
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1. Vaccination Coverage Survey of the Teknaf and Ukhia Upazilas- February 2000. Survey Report No. 01, August 2000
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Technical Report

1. Joint National/International Review of EPI Program in Urban Areas of Bangladesh—23 January – 3 February 2000. Technical Report No. 01, July 2000

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